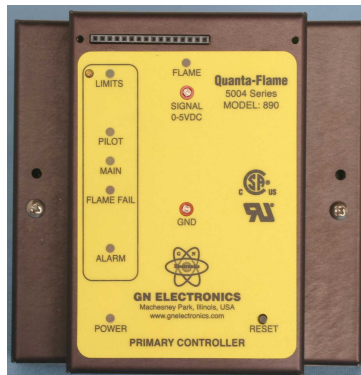


GN Electronics Inc.

Quanta-Flame 5004-890 Series

**Models
5004-890
&
5004-890-AR
(High UV Sensitivity and Automatic Reset)**

Primary Control



USER MANUAL

Revised: August 25, 2004

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DESCRIPTION

Quanta-Flame 5004-890 Series

This is a microcomputer-controlled primary burner management control system. This control is a direct replacement for the Honeywell RA890 series.

Optional diagnostic display is available

Installs easily
in the top of
the control.



Features

- Direct replacement with no rewiring
- Optional plug in diagnostic display
- Operates with existing Honeywell UV sensors and Flame Rods.
- Isolated 10 Amp relay alarm contact
- Easy mounting in control panels
- Pilot Test Mode
- Selectable Trial for Ignition times (3, 5, 10, or 15)
- Selectable interrupted or intermittent pilot
- Selectable Recycle or Non-recycle modes
- Every unit interfaces to ultraviolet or flame rod sensors
- Flame signal test jacks on front of control (0 to 5 VDC)
- High Ultra-Violet signal Sensitivity with auto reset and is available on the **5004-890-AR** model



Inputs

Power (Terminal 1)

Input that energizes the control electronics and sensor

Neutral (Terminal 2)

Grounded Neutral Connection to Control

Limits (Terminal 6)

Power and Interlocks including the control start switch

Low Voltage Control Contact (Terminals T & T)

Input is connected to contact switch. This must be a dry contact. No Voltage can be applied to these terminals. If this input is not used then a jumper must be placed between T & T in the base to complete the circuit. **Voltage applied to these terminals will damage control and void the warranty**

Flame Sensor (Terminals F & G)

Sensor input- Flame rod connects to Terminal F-- UV sensor connects to F & G

Outputs

Pilot (Terminal 3)

Output to energize the burner pilot valve

Ignition (Terminal 4)

Output to energize the ignition transformer

Main (Terminal 5)

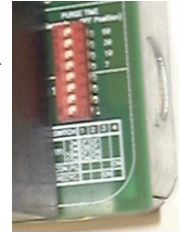
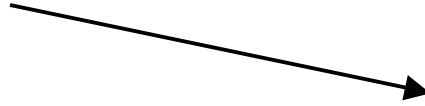
Output to energize the burner main valve

Alarm (NO, NC, C)

This is a dry contact output, which closes when an alarm condition occurs.

Control Configuration:

Setup Dipswitches: There is a set of 8 Dipswitches under the right side cover on the control. Switches 5 through 8 (top 4 switches) are not used on this control



Dipswitches 1 and 2 set the desired trial for pilot ignition time.
This value can be 3, 5, 10 or 15 seconds

Dipswitch 3 selects Non-Recycle or Recycle mode.

Recycle mode permits the controller to shut down and start the burner startup sequence again when a flame failure has occurred during the burner run cycle. In order for this to occur the main burner has to be up and running before a recycle can occur. A flame failure that happens before that time results in a lockout regardless if recycle is selected or not.

Dipswitch 4 selects interrupted or intermittent (non-interrupted) pilot.

An interrupted pilot will ignite during the trial for ignition time and be shut off 10 seconds after the main gas valve opens to light the main flame.

An intermittent pilot will ignite during the trial for ignition time and will stay lit when the main valve is open. It will remain on as long as the main burner is on and will shut down at the end of the main burner cycle.

DIP Switch Setup Table

DIP Switch Number		1	2	3	4
TFI	3s	Off	Off	Switch Number 3 turns the recycle feature on or off	Switch Number 4 turns the intermittent pilot feature on or off
	5s	On	Off		
	10s	Off	On		
	15s	On	On		
Intermittent pilot					On
Recycle				On	



Specifications

MECHANICAL:

Enclosure: 5" H by 5" W by 1 3/4" D

ELECTRICAL:

Voltage: 120 VAC 50/60Hz, Power consumption: 2VA

Temperature Range: -40°F to +140°F (-40°C to +60°C)

UL Recognized: File No. E233069

CSA Certified: Number 204571-1435343

Trial for Ignition times

Dipswitch Selectable

- 3 sec
- 5 sec
- 10 sec**
- 15 sec

Flame Failure Response Time: 2.5 to 3.5 seconds

Output connected load ratings

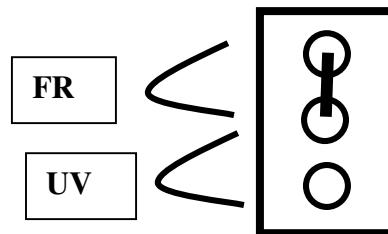
Pilot, Main, and Alarm Outputs: 10 amps resistive (1/4 HP inductive)

Note: Total connected load must not exceed 15 amps (1800 VA)

Shipping weight: 2 Lbs for all models

Inputs (User Selectable):

UV Sensor
Flame Rod



J2 terminal Strip
Located under the left side cover
Move jumper to select sensor
type (FR or UV)



Feature and Function Descriptions

LED indicators

The 5004-890 has Seven (7) LED indicators located on the front on the unit

Limits (green)- Indicates the presence of all the necessary interlock switches in order to begin the burner sequence The Limits light will blink on and off while the control is doing its internal self-check of all the relays and circuitry. Once the check is completed the green light will remain lit. If the control is in the pilot test mode the limit light will continue to flash as long as the control remains in pilot test mode.

Pilot (yellow)- indicates that the pilot valve is energized

Main (yellow)- indicates that the main gas valve is energized

Flame Fail (red)- indicates the burner failed to light

Alarm (red)- indicates a lockout condition has occurred

Power (red) indicates that power is applied to the unit

Flame (red) indicates the presence of a flame signal at the control

Function Summary

Recycle Mode- When selected, the control will recycle the burner through purge and startup when the main burner has shutdown with a flame failure alarm. The recycling of the burner will only occur after the main burner has been in operation. There is no recycle on pilot flame failure.

Pilot turndown test mode- this mode permits the pilot to ignite and remain burning regardless if interrupted or intermittent pilot has been selected. The main burner will not be ignited as long as the control is in this mode. This permits the service technician to adjust and inspect the pilot flame. To enter this mode hold the reset button down until the limit light begins to flash (10 seconds). To exit the pilot test mode press the reset button and the control will rest into the normal run mode.

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Interrupted pilot- the pilot will ignite and be turned off 10 seconds after the main burner valve is opened

Intermittent (non interrupted pilot)- The pilot will ignite and remain lit for the entire duration of the main burner run cycle

Pilot Verification feature- the ignition will be de-energized 5 seconds before the main valve is energized to insure the pilot flame is stable before lighting the main burner

False Flame indication- If the control senses a flame out of the proper sequence the sequence will stop and wait for 30 seconds for the false flame signal to disappear. During this time the Flame Fail light and the Alarm light will blink on and off. If the signal disappears the lights will cease blinking and the sequence will continue. If the false flame signal is present for more than 30 seconds the lights will stay on and stop blinking and the control will go into lockout.

Flame signal analog meter jacks Two test probe inputs are located on the front of the control. By inserting the meter probes from a high impedance (100k ohm/volt) DC volt meter the control will indicate the relative flame signal level in the range of 0 to 5 VDC. The positive probe goes into the jack labeled “Signal 0 to 5VDC”. The negative probe goes into the jack labeled “GND”. (Note: for high UV signal sensitivity requirements use the 5004-890-AR model)

Control Reset: When the control enters a lockout condition the red alarm light will light and begin blinking. To reset the control press the reset button on the front of the control. The standard control will not reset on power interruption. The 5004-890-AR incorporates an “auto reset” feature. With this feature the control will reset a lockout condition on power interruption.

Lockout conditions for the control are:

Flame Failure

False Flame present for more that 30 seconds

Relay Failure and internal fault



SENSORS for the 5004-890



Ultraviolet (Model 5004-01) The UV sensor detects light emitted from the flame within the Ultraviolet light spectrum.

Ultraviolet Self-Check (Model 5002-01) The UV Self-Check sensor detects light emitted from the flame within the Ultraviolet light spectrum. This sensor is intended for applications which continuously operate the burner (24 hours). The Self-check scanner interrupts the UV light from the burner every ten seconds to verify the proper operation of the sensing element and the internal components.

Flame Rod The flame rod works on the principle of Flame rectification and senses a small direct current flowing through the flame between the flame rod and the burner ground.

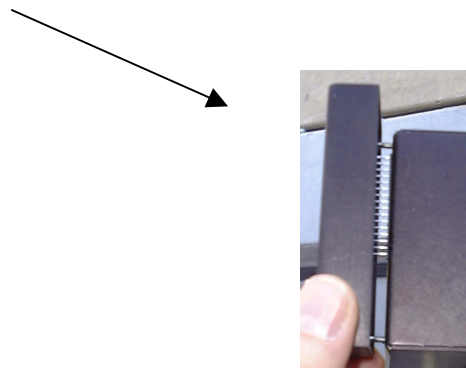
Optional Display

Installing the Display

Note: All power must be removed from the control when installing or removing the display. Failure to do so may damage the display and/or the control.

The optional display plug into the 16-pin connector at the top of the control. When inserting the display make sure that all the display pins are properly aligned with the connector.

The display is then secured to the control by tightening the two thumbscrews on the display



Contrast adjustment

Note: The contrast is previously adjusted and set at the factory. It is unlikely that any adjustments will be required except in unusual lighting situations or in high or low ambient temperature environments.

On the front of the control immediately to the left of the LIMITS light is a contrast adjustment, which can be used to vary the contrast. To adjust the contrast insert a small instrument screw driver into the hole and turn the screw clockwise for more contrast or counterclockwise for less contrast.

Once installed the display will show the steps of the control sequence and indicated when an alarm has occurred.

Once the burner is running after the start up sequence the display will indicate the flame signal level as a range between 0 to 5VDC

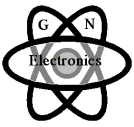
Installation Notes

- All installation, wiring, or service activities must only be performed by knowledgeable and qualified technicians.
- All system wiring should be run in accordance with the National Electrical Code and all local code requirements.
- Always remove all power to the system before wiring.
- The 5004-890 is secured to the wiring base by means of ten mounting screws located under the control side covers. →

These mounting screws also are the electrical connection of the control to the base. It is necessary for all of these screws to be securely fastened for the control to work properly.



- Do not run control wiring, ignition wiring, or sensor wiring in the same conduit.



Wiring the 5004-890

The wiring for this control is the same as the Honeywell RA890. It uses the same wiring base (Q270) and the terminal numbers and functions are identical.

Wiring Considerations

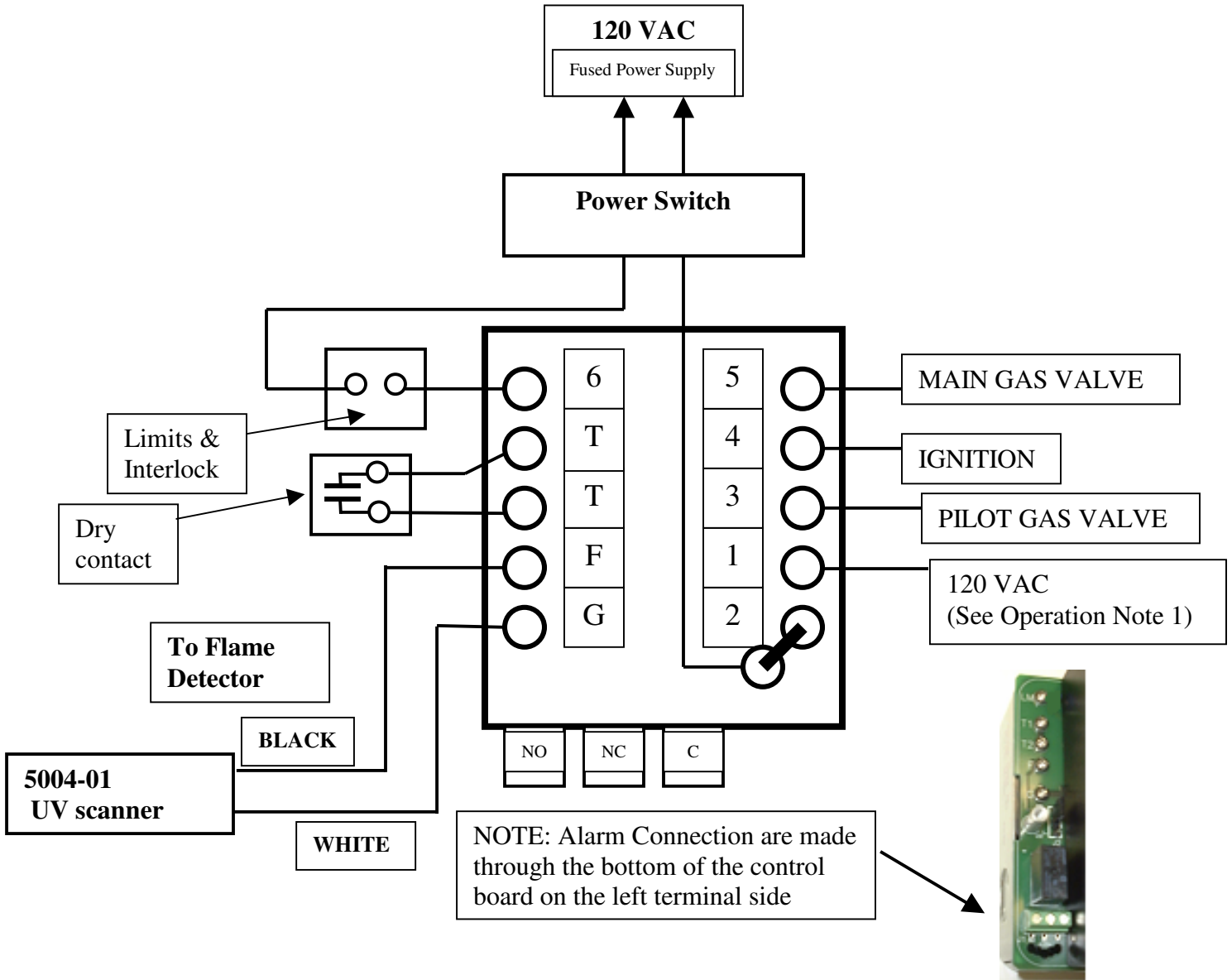
Depending on the output option used the wiring requirements will vary somewhat.

Output type	Suggested wire	Wiring run considerations
Contact	14 to 16 AWG	THHN or equivalent Nothing special- can be run with other wires in conduit
0 to 12VDC	14 to 16 AWG	THHN if wire is run in separate conduit
		Shielded cable if multiple wires are in one conduit
		Coax cable if long distance runs are required or if high level of electrical noise is present

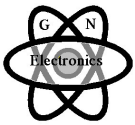
Note

All wiring runs to the field on, or near, hot surfaces should be rated for 90°C (195°F) or at least 25°C (50°F) higher than the surface temperature.

Wiring Diagram



Note 1: It is not necessary to connect 120VAC to Terminal 1. If 120VAC is already connected it must be from the same source as voltage connected to Terminal 6



Testing the Installation

This section describes the test procedures that must be performed after installation to insure that the 5004-890 and the connected sensor is operating properly; **these procedures are mandatory.**

These tests are to be performed after any installation of the 5004-890 control, regardless if it is a new installation or a replacement installation for an existing control

Insert the positive probe of a 0-10 VDC, digital voltmeter into the test point on the front cover of the 5004-890; insert the negative probe to ground point. Good flame signal strength will read between 2 and 5 VDC; anything below 1 VDC is inadequate. Also, the red flame light illuminates when a flame signal is indicated.

Minimum Pilot Test

Run the following test procedures to ensure that the sensor will not detect a pilot flame too small to reliably light the main flame:

- 1) Manually shut off the fuel supply to the burner, but not to the pilot.
- 2) Start the system normally.
- 3) To enter the pilot test mode, press and hold the reset button for ten seconds on the front of the 5004 control.
- 4) The control will hold the operating sequence at the pilot flame step. Measure signal strength as described above.
- 5) Reduce pilot fuel until the flame relay drops out. Increase pilot fuel until the flame signal is greater than 1 VDC, and flame relay just manages to pull in. This is the minimum pilot. If you don't think this flame will be able to safely light the main burner, realign the sensor so that it requires a larger pilot flame and repeat steps 2 through 5.
- 6) Push the reset button located in the lower right corner on the front cover to reset the control into the normal and begin the normal start-up sequence again.
- 7) When the sequence reaches the main flame trial for ignition, smoothly restore the fuel supply to the burner. If the main burner does not light within five seconds, immediately shut off the burner supply to shut down the system. Realign the sensor so that it requires a larger pilot flame. Repeat steps 1 through 6 until the main burner lights off smoothly and reliably.



Pilot Flame Failure Test

- 1) Manually shut off the fuel supply to the pilot and the main burner.
- 2) Place system in pilot test mode
- 3) Start the system normally. The controller should lock out; if it doesn't, then the controller is detecting a false flame signal. Find the problem and correct it before resuming normal operation.

Main Flame Failure Test

- 1) Manually shut off the fuel supply to the main burner but not to the pilot.
- 2) Start the system normally. This should ignite the pilot and lock out after pilot interruption. If the system does not lock out, the controller is detecting a false flame signal Find the problem and correct it before resuming normal operation.

Spark Sighting Test

- 1) Manually shut off the fuel supply to the pilot and the main burner.
- 2) Start the system normally.
- 3) Measure the flame signal.
- 4) If a flame signal greater than 1 VDC is measured for more than three seconds during the trial for ignition, then the sensor is picking up a signal from the spark plug

Note: Periodically check all interlock and limit switches by manually tripping them during burner operation to make sure they cause the system to shut down.

Warning: Never operate a system that is improperly adjusted or has faulty interlocks or limit switches. Always replace faulty equipment with new equipment before resuming operation. Operating a system with defective safety equipment can cause explosions, injuries, and property damage.



Warranty and Returns

The 5004-890 is warranted for one (1) year from the date of delivery against manufacturing defects only. GN Electronics standards terms and conditions apply. Defective units should be returned undamaged to G N Electronics. Controls should be well packed in a suitable container encased in appropriate stuffing.

These Controls are factory assembled and are not internally serviceable. The main cover is not to be removed for any reason. To do so voids all warranties and liabilities from GN Electronics.

All products should **be shipped prepaid to:**

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